

Document I	R	Source	Issue Date	Page	
US 5976234		USP 19991102	11	Sel	
2 US 5397362		USP 19950314	5	Imp	
3 US 5077079		USP 19911231	4	Met	
4 US 4976736		USP 19901211	8	Cos	
5 US 4794171		USP 19881227	11	Cal	
6 US 4222128		USP 19800916	5	Com	

United States Patent [19] [11] Patent Number: 5,976,234  
Chow et al. [45] Date of Patent: \*Nov. 2, 1999

[54] SELF-SETTING CALCIUM PHOSPHATE CEMENTS AND METHODS FOR PREPARING AND USING THEM

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[73] Assignee: American Dental Association Health Foundation, Gaithersburg, Md.

[\*] Notice: This patent is subject to a terminal disclaimer.

[21] Appl. No.: 08/846,145

[22] Filed: Apr. 23, 1997

Related U.S. Application Data

[60] Continuation of application No. 08/478,670, Jun. 7, 1995, abandoned, which is a division of application No. 08/126,502, Sep. 24, 1993, Pat. No. 5,525,148.

[51] Int. Cl.° C09K 3/00

[52] U.S. Cl. 106/35; 106/690; 106/691;

106/792; 623/16; 433/201.1

[58] Field of Search 106/35, 690, 691,

106/692; 623/16; 433/201.1

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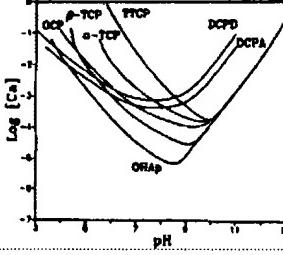
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[57] ABSTRACT

The invention includes methods and compositions relating to calcium phosphate cements, which self-harden substantially to hydroxyapatite at ambient temperature where in contact with an aqueous medium. More specifically the cements comprise a combination of one or more sparingly soluble calcium phosphates other than tetracalcium phosphate with an aqueous solution adjusted with a base to maintain a pH of about 12.5 or above and having sufficient dissolved phosphate salt to yield a solution mixture with phosphate concentration equal to or greater than about 0.2 mol/L.

22 Claims, 1 Drawing Sheet



EAST search 3/29/01

best art

Document	Issue Date	Page	
1 US 6201039	USP 20010313	17	Bon
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3 US 6183515	USP 20010206	26	Art
4 US 5397362	USP 19950314	5	Imp
5 US 4976736	USP 19901211	8	Coa
6 US 4794171	USP 19881227	11	Cal
7 US 4222128	USP 19800916	5	Com

(12) **United States Patent**  
Brown et al.

(10) Patent No.: **US 6,201,039 B1**  
(45) Date of Patent: \*Mar. 13, 2001

(14) **BONE SUBSTITUTE COMPOSITION  
COMPRISING HYDROXYAPATITE AND A  
METHOD OF PRODUCTION THEREOF**

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(\*) Notice: This patent issued on a continued prosecution application filed under 37 CFR 1.53(d), and is subject to the twenty year patent term provisions of 35 U.S.C. 154(e)(2).

Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 00 days.

(21) Appl. No.: **08/617,809**

(22) PCT Filed: **Sep. 20, 1994**

(86) PCT No.: **PCT/US94/10604**

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PCT Pub. Date: **Mar. 30, 1995**

**Related U.S. Application Data**

(63) Continuation-in-part of application No. 08/124,731, filed on Sep. 21, 1993, now abandoned.

(51) Int. Cl. **7** A61F 2/28

(52) U.S. Cl. **523/115; 424/423**

(58) Field of Search **424/423; 523/115,  
523/116**

**22 Claims, 5 Drawing Sheets**

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**Primary Examiner—Carlos Azpuru**

(74) Attorney, Agent, or Firm—Thomas J. Monahan

(57) **ABSTRACT**

The present invention is directed to polymimetic particles which are precursors of hydroxyapatite and a method for their production. The present invention is also directed to a synthetic bone-like composition comprising said hydroxyapatite polymimetic precursor particles of hydroxyapatite and optionally, a polymeric material capable of promoting mineralization of hydroxyapatite, which are useful for fixing prosthetic devices, useful as bone substitutes to directly fill bone defects, to provide substrates for cartilage, and to repair teeth, and methods of making such preparations. The present invention is also directed to a method of treating collagen to provide a micro-structure close to that of native bone.

